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OPERATION MANUAL
OPTICAL THERMOMETERS FOR THE MEASURE OF TEMPERATURE PROFILES

SKS
-32 ....1200°C

UNI EN ISO 9001:2000 n.2452/0

CONTENTS

1. General
2. Technical Data
3. Measuring ranger and optics
4. Electrical and mechanical installation
   - 4.1 Electrical installation
   - 4.2 Electrical accessories
   - 4.3 Mechanical accessories
   - 4.4 Mechanical installation
5. Setting the parameter via service interface
6. To avoid errors at measuring process
7. Maintenance
8. Warranty

Appendix A: Table of emissivity

1. GENERAL

Congratulation on choosing the stationary IR-Compact Sensor for Non-contact temperature measurement. You are now the owner of a pyrometer a thermopile-detector.
The instrument, depending on spectral characteristics, is supllied either with a Germanium - lens (SKS-T14) or with a ZnS - lens (SKS-T4, SKS-T5).

With its adjustable emissivity, response time and measuring subranges (within the measuring ranges) the instrument can be flexibly used for many temperature measuring applications.
The solid construction of the whole sensor as well as the extensive equipment allows various uses even in rough environments.

Please read this manual carefully before installing and setting up your Compact Sensor from SITEL Control.

If you have any question, please contact our costumer service:
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2. TECHNICAL DATA

Pyrometer Type	Measuring range	Spectral range	Distance to Spot size
SKS-T4-10	300 ... 1000 ° C	3.9 µm	33 : 1
	572 ... 1832 ° F		
SKS-T5-12	100 ... 1200 ° C	5.14 µm	50 : 1
	212 ... 2160 ° F		
SKS-T14-09	-32 ... 900 ° C	8 ... 14 µm	50 : 1
	25.6 ... 1652 °F		

Response time t_{90}[1)]:	100 ms (factory preset)
Accuracy:	1% of the measuring value in °C + 1K (at 23 °C; 73.4 °F)
Repeatability:	0.5% of measuring value in °C + 1K
Emissivity:	20 ... 100%, adjustable (100% factory preset)
Measuring output:	4 ... 20 mA, load independent DC current, linear to selected measuring measuring subrange Attention: At ambient temperatures >75 °C the output is fixed to 3.9 mA!
Maximum load:	700 Ω (24 V); 400 Ω (18 V); 1000 Ω (30 V)
Power supply:	24 V dc ± 25%, stabilized, ripple < 50 mV!
Power consumption:	= 1.5 VA
Safety sistem:	IP 65, acc. DIN 40 050
Operatine temperature:	0 ... 70 °C; 32 ... 158 °F
Storage Temperature :	-20 ... 70 °C / - 4 ... 158 °F
Housing:	Stainless steel Æ M40 x 1.5 mm, ca. 120 mm long
Weight:	ca. 450 g
Connection cable:	2.5 m
EMC:	CE - Label in accordance with EU rules about electromagnetic immunity By using the instrument with opened setup port cover the CE - permission will cease!

[1)] Response time, emissivity and measuring subrange (minimum measuring subrange is 50 K) are adjustable via service - interface with a PC or the handheld configurator *HP 03*.

3. MEASURING RANGER AND OPTICS

The Infrared-Compact-Sensors are supplied with one of the optics shown below.
Please specify optics when ordering.
The optics can **not** be changed by the customer.

Pyrometer Type	Measuring range	Available Optics	OrderNo.
SKS-T4-10	300 ... 1000 ° C	3IV, V, VI	SK51000 - 4 (-4, -5, -6)
	572 ... 1832 ° F		
SKS-T5-12	100 ... 1200 ° C	IV, V, VI	SK41200 - 4 (-4, -5, -6)
	212 ... 2160 ° F		
SKS-T14-09	-32 ... 900 ° C	VII, VIII, IX	SK1X900 - 4 (-7, -8, -9)
	25.6 ... 1652 °F		

Optical data:

Spot size diameter M (mm) at distance a (mm)
Note: the focus is marked in **blod** letters.

OPTICS	A = 0	100	200	300
IV	15	**2.5**	18	35

OPTICS	A = 0	100	200	300
VII	15	**2**	18	35

OPTICS	A = 0	300	600	1000
V	15	**6**	22	45

OPTICS	A = 0	300	600	1000
VIII	15	**6**	22	45

OPTICS	A = 0	1200	2500	4000
VI	15	**24**	50	80

OPTICS	A = 0	800	1500	2500
IX	15	**16**	36	68

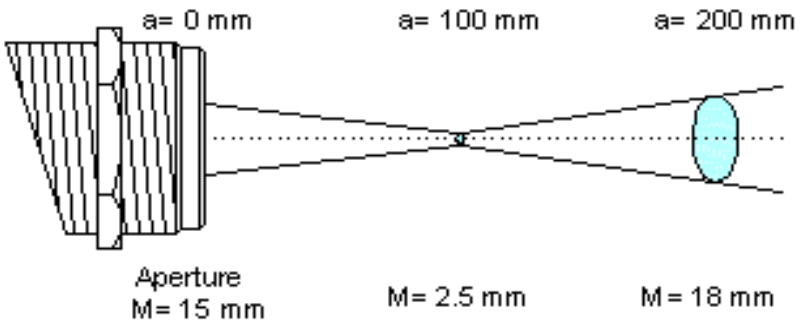


Fig. 1: Example Optics IV

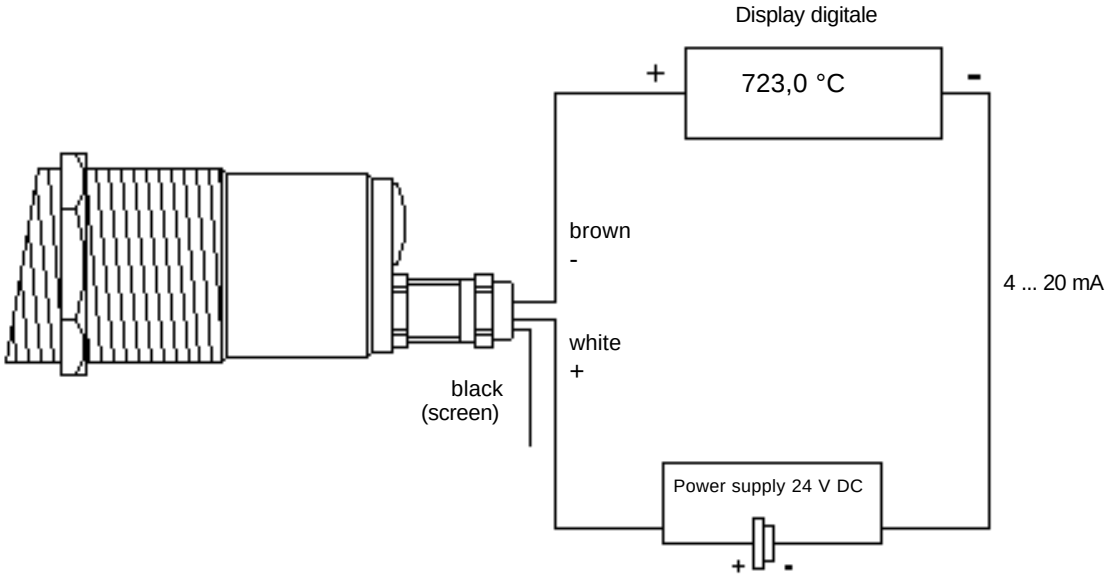
4. ELECTRICAL AND MECHANICAL INSTALLATION

4.1 Electrical installation

The Infrared-Compact-Sensor SKS-T requires a power supply of 24 V dc ± 25%.
The maximum ripple on the dc supply voltage must be less than 50 mV.
If the pyrometer has been connected it is immediately ready for use.
For wine assignment please see drawing below.
When connecting the power supply, the polarity must be observed correctly.

Note: Factory presets at the instrument:

Response time T_{90}:	100 ms
Emissivity:	100%
Measuring range:	Maximum measuring range



4.2 Electrical accessories

Digital Indicator SA-2W equipped with two levels alarm and temperature with transmetion either in analog and digital way and also of other process functions.

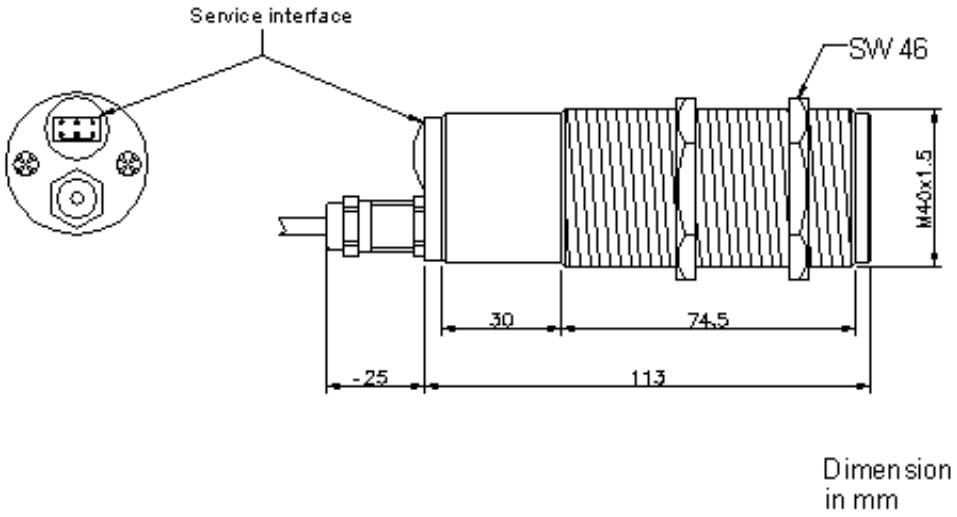
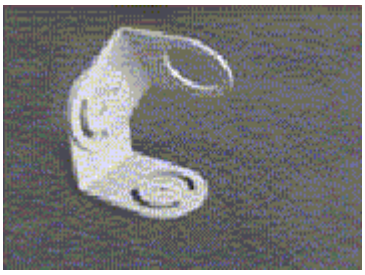


Fig. 3: Device dimensions

4.3 Mechanical accessories



Stainless steel air purge unit

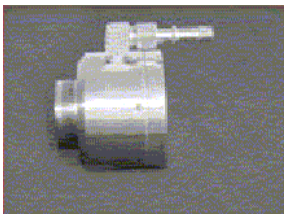
The air purge unit protects the lens of your pyrometer even in rough environments against dust, humidity or other suspended matters.
The air flow rate is about 25 to 30 l/min at a pressure of 0.2 to 0.5 bar.
The air must be clean dry and oilless.

Cooling jacket with airpurge, stainless steel
(air - or watercooling)

The stainless steel housing protects the instrument in high temperature environments (above 70 °C). With this housing the instrument operates at ambient temperatures up to 170 °C.
(Cooling water flow rate should be 4 l/min at 20 °C).

Laser pilot light unit, stainless steel

The laser pilot light unit assists you to target even smaller objects reliably with a laser point.
The unit is filled out with a counterthread for screwing on the pyrometers front.



Vacuumadapter, stainless steel:

The vacuumadapter enables the installation of the pyrometer to a vacuum-chamber.
TYP B - Vakuumadapter with ZnSe - window: for series SKS-T14, -T4, TYP C - Vakuumadapter with CA F_2 - window for SKS - T5.

5. SETTING THE PARAMETERS VIA SERVICE - INTERFACE

The emissivity,the response time as well as the measuring subranges (within the full measuring range) may be adjusted with the optional PC-software and the PC-adapter cable.
The software is a PC-based application which will run from WIN 95 on.

Important! The service-interface is not galvanically insulated. For changing the instrument's parameters via service interface only use a **laptop** computer, wich is not powered by a line voltage power suplly and is **not** connected to other devices (e.g. printer).
Otherwise the pyrometer could be damaged.

Connecting the pyrometer for configuration

1. Remove the port cover from the pyrometers back side;
2. Connect the set up cable to the 6 - pin connector inside the pyrometer's setup port and the 9 - pin connector to a serial PC - interface port ;
3. Connect the pyrometer to a supply (e.g. SA-2W);
4. Run IP_SERV.EXE from the disc (which is supplied with the cable) or a copy form your harddisc.

If all is connect correctly, the program will start with the screen shown in Fig. 4:

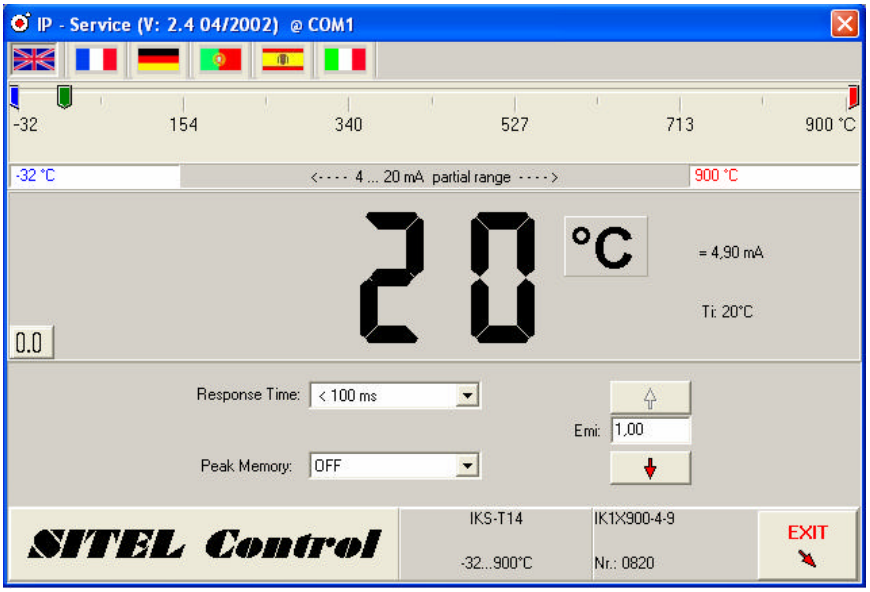


Fig. 4: Settings: e = 1; Response time: 100 ms; Peak Memory: OFF;
Measuring subrange:-32 ... 900 °C; Shown temperature: 20 °C

The software dialogues can be configured to present information in several languages by clicking on the appropriate flag button.
The PC-program is self-explanatory, for operation from HP 03 please read the user manual of these additional device.
If pyrometers configuration is complete:

1. Disconnect the pyrometer from the power supply
2. Re-fit the port cover on the pyrometers back side.

6. TO AVOID ERRORS AT MEASURING PROCESS

1. The diameter of the measuring object may not be smaller than the spot size of the selected optics.
2. The emissivity of the measured object should be set correctly on the pyrometer via software.
3. Please take care, than no interfering sources between object and pyrometer can influence the measuring result. (e.g. dusty air)

Dirty lenses may cause wrong measuring values.
In dirty environments we recommend the use of an air-purge unit.

7. MAINTENANCE

The Infrared-Compact-Sensors have not internal parts which have to be cleaned or can be repaired or replaced by the customer.
If necessary the lens can be cleaned with oilfree and clean air or with a dry, soft cloth.
In case of fault the instrument should be shipped back to the builder for repair is not possible to repair it on field.

8. WARRANTY

SITEL Control offers a warranty of 12 month form the invoice date.
This warranty does not cover damage caused by inexpert cleaning or damage of the lens or use of force.
Warranty is void if the sealed screws on the back of the pyrometer are loosened.

Appendice A: table of Emissivity at λ = 8 ... 14 µm

MATERIAL	EMISSIVITY / EMISSIVITA'
Black body	100
Human skin	98
Black matt paint	95
Soot	95
Water	95
Wood	80 ... 92
Masonry	85 ... 95
Rubber	85 ... 95
Plastics	85 ... 95
Porcelaine	85 ... 95
Ceramics	85 ... 95
Paper	85 ... 95
Plaster of Paris	85 ... 95
Oil paints	85 ... 95
Asphalt	85
Textiles	75 ... 95
Graphite	75 ... 92
Cement	90
Glass	80
Quartz	80

The values apply for mean effective wavelenght λ = 8 ... 14 µm (thermopile).
Differences in surface finishes or roughness may cause deviations.

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